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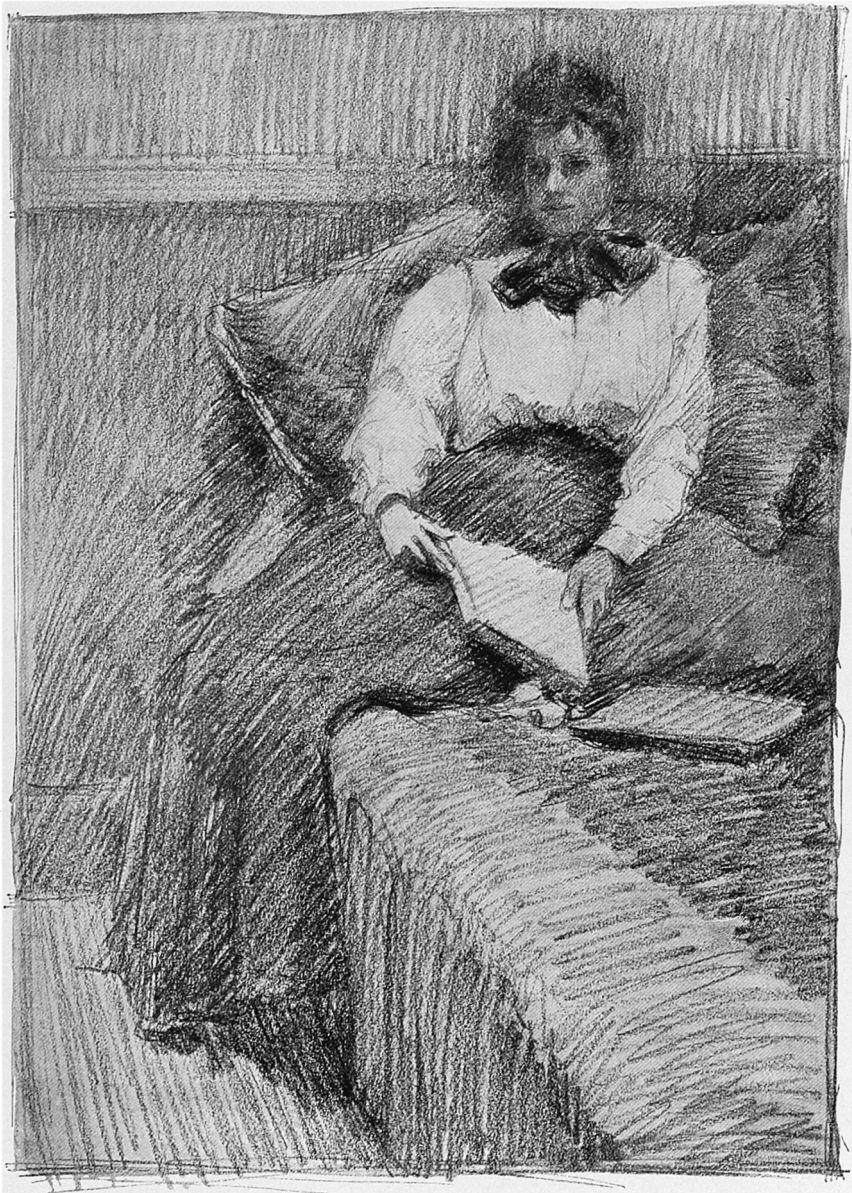
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PENCIL SKETCH
Example of Student Work
Chicago Academy of Fine Arts

BRUSH AND PENCIL

ILLUSTRATED ART NEWS SECTION

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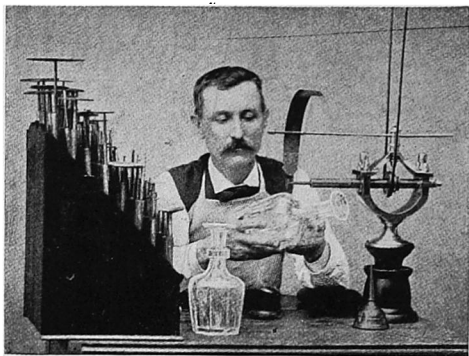
No. 5

THE ART INDUSTRIES OF AMERICA—IX

THE MANUFACTURE OF CUT GLASS

Four or five years ago it was stated in BRUSH AND PENCIL that no line of products offered more conclusive proof of the superiority of American art manufactures than cut glass. To-day, the statement may be reiterated with even more ground for what may seem a boast than then. A decade ago American glassware was looked upon with suspicion, damned with faint praise, or even openly condemned as being of poor texture and inartistic design. Now the glassworkers of the United States make the proud boast that their product, both in texture and design, is unequalled, and the European manufacturers, who formerly supplied the American market, are forced reluctantly to confess that the claim of their New York rivals is founded on fact, and not on presumption. There are, at the present time, in this country, over sixty manufacturers of cut glass, scattered from the Mississippi to the Atlantic coast, but located, for the most part, in southern Massachusetts, southern New York, and north-eastern Pennsylvania, who are daily turning out ware with which the imported goods brought from Europe bear no comparison. An art industry, therefore, of such magnitude and excellence, naturally find a place in the present series of articles.

The development of the cut-glass industry in America is similar to the development of artistic pottery. The industry had to pass through its infantile stages, and a rather discouraging infancy and childhood it had. There was no dearth of artistic talent on the part of American de-



A GLASS ENGRAVER AT WORK

signers, no lack of material suitable for the finest work, no want of cleverness and enterprise among native glass-workers. But the purchasing public was prejudiced against home product, and just as in the case of artistic pottery, it was said, tacitly or openly, that nothing good came



EXAMPLES OF AMERICAN CUT GLASS

from America. The popular demand was for imported glassware, and nothing but imported, or what purported to be imported, goods would satisfy the purchasers. Long before American manufacturers obtained public recognition, their product was practically as good as it is to-day, but it was shelved in deference to this senseless prejudice; and it was not until 1893, when home-made goods were placed in sharp comparison with European products, that the American public saw the intrinsic beauty and worth of the output of our factories, and realized the inanity of its

former practice of prizing only that which was imported, or said to have been imported. Recognition of worth was bound to come, and late it did.

The turning-point having been passed, the development of cut glass in the United States has been quite unprecedented. Our manufacturers



EXAMPLES OF AMERICAN CUT GLASS

have realized the opportunity opened to them, and with the conviction that this country could supply artistic products as well as raw material, they have been strenuous in maintaining the rank which persistence and merit finally won for them. They have evolved their own styles and have educated their own workmen, keeping ever before them the work of their European competitors. They have the satisfaction to-day of knowing that their efforts are fully appreciated, that their wares find ready sale.

It is not my purpose in again presenting the facts of American cut

glass manufacture to extol or to compare the products of different native manufacturers. Indeed, there is little that is distinctive about cut glass that lends itself to exhaustive treatment, outside of technical books. Purity of texture, grace of design, and skillfulness of workmanship are the three factors in popular estimations that enter into the beauty of those iridescent pieces over which lovers of the beautiful grow enthusiastic. Authoritative information about the methods and difficulties of the factory, however, will be of interest. The workman has not the scope and latitude enjoyed by the potter. He is denied the privilege of color, for instance, and of many another pleasing decorative effect, as I before pointed out. He simply takes the purest and intrinsically least decorative material and shapes from it a thing of beauty. Hence, material apart, grace of design and skill in manipulative treatment are the two things upon which he must rely.

It is surprising how little is known, even by the most enthusiastic admirers of cut glassware, of the processes through which a piece must go. The art of glass-making dates back at least to the days of Egypt, Assyria, and Phoenicia, and the process of glass-making is to-day practically the same as it was thousands of years ago. We in modern times have attained exceptional successes in the art, as regards material, only by excessive care in the selection of ingredients and in skill in manipulation. Glass-



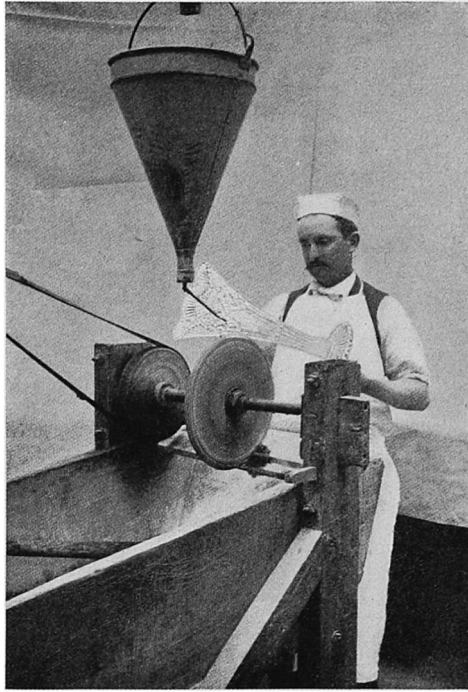
EXAMPLES OF AMERICAN CUT GLASS

cutting, however, is a different matter, and deep cutting, as practised to-day, dates only to the early part of the nineteenth century, and is really an art incident to the invention of the steam-engine. Great as was the reputation acquired by the Venetians as glass-workers, there is no evidence to show that they were glass-cutters, and the Roman glass-cutting was limited to the engraving of glass camcos. Really, then, glass-cutting is strictly a modern art, one made possible by developments in other lines.

The art of choosing wisely and combining judiciously the various ingredients that enter into the composition of our best glass is, from the standpoint of the glass-cutter,

no less a comparatively recent attainment. One commonly thinks of glass simply as a colorless, transparent substance, which in a molten state lends itself readily to manipulative purposes. Between the common, cheap glass of commerce and the material required by the glass-cutter for producing his best effects, there is all the difference in the world, and the efforts of the best engravers would be abortive if the supremest care were not taken in the composition of the material.

The bases used in the manufacture of glass, as is commonly known,—there is little use of my seeking new phraseology for a subject about which little that is new can be said,—are soda, potash, lime, alumina, and oxide of lead, and the relative proportions of these ingredients and the way in which they are treated determine the quality of the material. If the manufacturer wishes to make his glass more fusible, he adds potash and soda; if less fusible, he adds alumina. If he wishes to make his material harder, he resorts to a more liberal use of lime. To heighten refractory powers or increase luster, he uses a generous solution of lead.



A ROUGHER AT WORK

The importance, therefore, of a full knowledge of the relative percentages of the different ingredients can readily be seen, and hence it would scarcely be an exaggeration to say that the man who prepares the material must, in a sense, be as much of an artist as the man who cuts the finished piece. With poor material nothing artistic can be accomplished.



EXAMPLES OF AMERICAN CUT GLASS

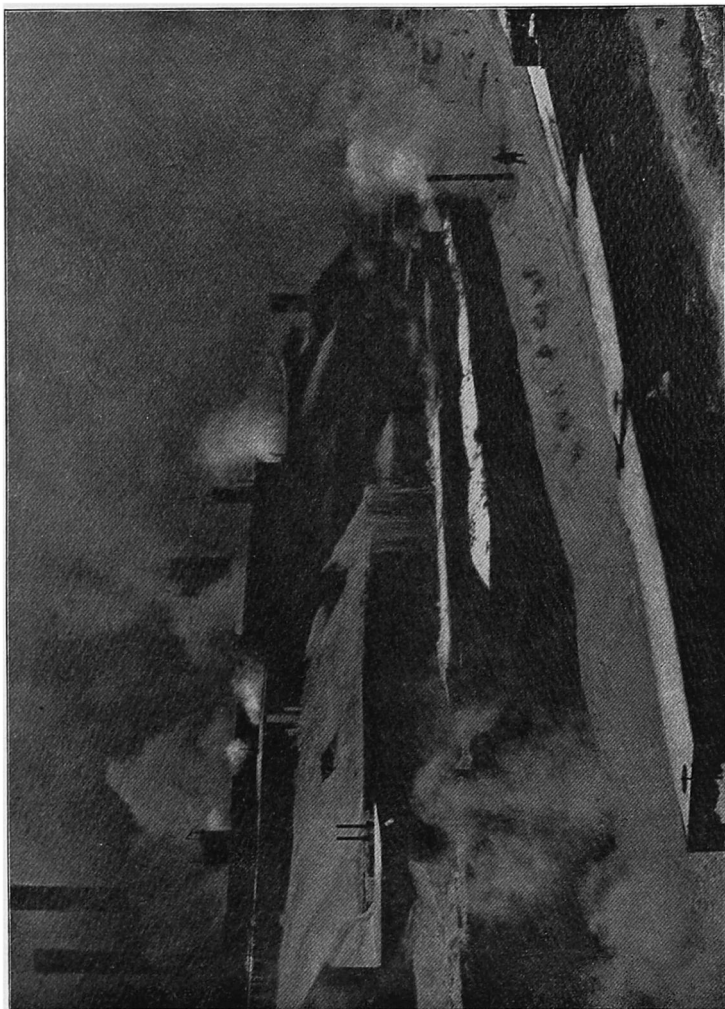
"In making bottles, the cheapest glass," said a prominent manufacturer recently, in explanation of the methods commonly followed, "lime is added to the potash, or soda and silicate. The medicine-bottle, a better glass, has more potash. Window-glass contains both potash and soda; the finer kinds of glass made without lead are called crown glass. But where glass of the finest quality for cutting and polishing is desired, oxide of lead must be used, and, in general, a better grade of sand and alkali. This is often called flint-glass, as distinguished from the

cheaper or lime-glass. The flint-glass is heavier as well as more brilliant. The lime-glass has a decidedly greenish tint. Lead or flint glass may also be recognized by the clear tone it gives forth when struck, as a bell. If color is desired in flint-glass, certain metallic oxides are used with the usual ingredients. The addition of oxide of copper gives a blue color, while oxide of iron imparts a yellow. Pure gold yields a ruby-red."

These facts may seem encyclopedic, but they are important for an understanding of the means used and the care needed in the preparation of the material used by the American glass-cutters. A wrong selection of ingredients, or an excess of one ingredient over another, would be fatal for the result desired. Hence all ingredients must be selected with the greatest care, weighed with extreme accuracy, and thoroughly mixed. This mixture constitutes the "batch," as it is called, and it will be of interest to the reader to follow it through its various stages until it appears, through the manipulations of the workmen, luminous with brilliancy and glinting with prismatic color. The clay-pot or crucible must be in perfect condition for the reception of the mixed ingredients. First the batch is gradually brought to melting-point, which is approximately 2500 degrees Fahrenheit. It is then allowed to cool slowly until it is of the proper consistency to "gather." This consists in a workman inserting into the mass the end of an iron blowing-pipe to which a quantity of the molten glass adheres. The pipe is passed to a second workman, who gives some semblance of form to the piece by blowing, and then passes it on to the "gaffer," or foreman, who puts the piece into its final shape.

The article is now too brittle to be of service, and must be annealed. The articles, according to size, are placed in a kiln, or a "leer," or oven, every possible care being taken to guard against the slightest draft of air, since this would crack the glass. A hard-wood fire is maintained under the pieces to be annealed for about a day, after which it is removed, and the doors of the kiln are sealed hermetically. In this air-tight compartment the larger pieces of glass remain for about a week. The temperature is reduced by natural radiation until the ware is cool enough for handling. The ovens, or leers, used for annealing small pieces are about sixty feet long, with a fire-box that extends only about the first six feet. The ware is placed on pans hooked together and conveyed slowly from one end to another by an endless chain. This trip of about sixty feet requires twenty-four hours. Thus, according to the size and thickness of the glass, the time required for annealing is from one to seven days. Every piece as it comes from the oven is carefully examined by experts trained to detect the slightest flaw in the material. Perfect pieces are now ready for the cutter.

The "rougher" first makes a comparatively rude outline of the design on the surface of the glass with a reddish gummy fluid. The pattern is then "roughed" in with revolving disks kept moist with sand and water. These disks, or iron wheels, vary in size and thickness according to the necessities of the pattern, frequently a dozen or more disks being



TYPICAL FACTORY SCENE



required for "roughing" in the pattern of the piece. This step being finished, the ware passes into the hands of the foreman for his critical inspection, after which it goes to the "smoother," who smooths down the rough edges of the incised pattern with stone wheels, likewise kept moist with dripping water. Not infrequently certain portions of the pattern are cut directly by the "smoother" without "roughing."

The nicety required in this work can readily be understood. If the cutting disks get "out of true," the pattern will be irregular, and lack the perfect lines necessary for the finest effect. If the tiniest pebble finds its way in the sand to the surface of the disk, it is likely to utterly ruin the article in a second. Patterns require cutting from a hair-line on tiny articles to incisions of considerable depth in larger and more costly pieces. The inexperienced would scarcely realize the nicety of touch required on the part of the cutter. He must know instinctively how deeply his wheel is penetrating into the material, and when to remove the glass from the cutting apparatus. A slight excess of pressure would over-heat and fracture the glass, and thus ruin a costly article, when practically all the pattern had been incised upon it. From the "smoother" the ware goes to the "polisher." First wooden wheels fed with a mixture of pumice, rotten stone, and water are used, and then brush-wheels moistened with the same preparation. Next the articles are brushed with putty-powder, a preparation of tin and lead, and finally they are polished with wooden or cork wheels moistened with putty-powder, or with thick felt wheels.

This brief outline will give the reader some idea of the various stages through which a single article of cut glassware has to pass in evolving from a formless mass of ingredients into a thing of beauty and utility. It will be seen that there is not a step in the process at which the slightest mistake or slip would not prove fatal to the finished result. Designs, for the most part, are of geometric pattern, since these lend themselves most readily to the use of the wheel. Lapidary cutting, commonly seen on stoppers for bottles, and engraving upon glass are simply variations of the process already described, the difference being, not one of the methods and means so much as of pattern. In the latter, more latitude is allowed to the engraver, who cuts away the material in a sort of free-hand manner, so as to produce figures, flowers, and so forth. In engraving, the workman uses copper wheels, which vary in size from the diameter of a pin's head up to six inches or more. Some of these wheels are as thin as a hair, while others are a quarter of an inch thick. These are attached to the end of a steel rod which is fastened to a lathe, the revolving disks being moistened from time to time with drops of oil and emery-powder. The engraver is thus, in a sense, an artist, and not a mere copyist, and within the limited scope permitted by his tools and his material, has an artist's liberty to work something of his own individuality into his patterns. The two accompanying illustrations showing workmen at their wheels, the larger a "rouger" and the smaller an "engraver," will perhaps convey a better

impression of the glass-cutter's peculiar work than a verbal description of the methods followed by these two classes of important operatives.

Those at all familiar with cut glass know there is a vast difference in the quality of the ware placed upon the market. The most highly prized articles transmit light as colorless as a crystal. Inferior articles show a distinct tint, giving a yellowish, greenish, or smoky effect. These variations are a matter for which the mixer of the ingredients is responsible, and he is the best workman who can so apportion and mix his materials as to approximate most closely to the perfect crystal. Again, in the better class of ware the patterns are more carefully executed, the lines are perfect in their symmetry, the incisions are sharp and clear-cut, and the polishing is done with perfect evenness. In inferior work, on the other hand, the patterns betray irregularities that militate against the effect of the piece as a whole, there are breaks in the fluent lines, and flaws in the polished surfaces. Hence there are few lines of art work requiring greater precision and deftness from start to finish on the part of the workmen than cut glass.

I do not contend here any more than I did when I first presented these facts, that Americans have succeeded in producing clearer and more perfect material than Europeans, but I do contend that within the last decade or two we have educated a large body of workmen who are second to none in the world in this peculiar, painstaking art industry. It is further contended that in point of artistic patterns our designers have been more successful than those who have produced the stock patterns of the Old World product. It may safely be said that Europe has produced prize pieces that have never been excelled. But these individual pieces can scarcely be taken as the standard by which to assign rank to the respective industries of the two continents. The average of excellence in the gross output, taking into consideration clearness and texture of material, perfectness of cutting and polishing, and charm of design, should more properly be taken as the standard. From the standpoint of this average excellence American workers in cut glass are now in position to become teachers of the European workers, their former mentors.

EDWARD L. PRENTISS.

